

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Annihilation of Vortex Pairs in Submicron Permalloy Stadia¹ PETER EAMES, HAO WANG, C.E. CAMPBELL, E. DAN DAHLBERG, Department of Physics, University of Minnesota — The annihilation processes for a vortex pair in a submicron, stadium shaped permalloy particle were studied using micromagnetic simulations. The stadium shape, defined as a rectangle with semicircular ends, preserves much of the circular symmetry while still allowing multiple vortices to be stable at remanence. Beginning from the remanent state of a vortex pair located symmetrically along the long axis of the stadium, a magnetic field is applied along the short axis in the direction opposite to the remanent magnetization between the vortices, which is along the short axis. Two separate field regimes are observed. In the first, the vortices move as a function of the applied magnetic field toward one another on the center line. In the second, the vortices veer along the axis of the applied field to opposite straight sides of the stadium, annihilating at a critical field. The annihilation fields and successor states depend upon the relative polarization of the vortex cores. The results of the simulations are compared to recent experiments on the same system.

¹Research supported in part by ONR.

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Date submitted: 08 Feb 2005

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